

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1-22. (Canceled)

23. (New) A method of heavy particle separation, comprising a primary separation stage, the primary separation stage comprising:

dropping of particles onto a transversely operated belt that is moved in a direction transverse to the direction of movement of particulate material;
accumulating a first group of particles having substantially medium to low density;
concentrating a second group of particles having substantially medium to high density,
concentrating comprising:

providing a variable concave profile in the belt; and
subjecting particles to separation in the concave area; and
discharging particles from each of the groups.

24. (New) The method of claim 23, further comprising a secondary separation stage for concentrating the particles, the secondary separation stage comprising:

infedding the particles to a stilling plate;
stilling the particles on the stilling plate; and
feeding the particles into a retaining zone and retaining the particles.

25. (New) The method of claim 23, further comprising using a spiral formation provided on the belt to provide effective heavy particle separation.

26. (New) The method of claim 25, wherein the spiral formation provides effective heavy particle separation in one or more of the following ways:

moving particles transversely to the belt movement;

fluidising the particles so that light particles are scoured off from its upper layer and heavy particles are drawn back toward the upper end of the belt;

providing increased retention time for material on the belt resulting in repetitive and more accurate evaluation of the relative densities of the particles.

27. (New) The method of claim 23, further comprising a preliminary separation stage.

28. (New) The method of claim 27, wherein the preliminary separation stage comprises:

adding water to the feed material;

scrubbing;

classifying by size; and

transporting to the primary separation stage.

29. (New) The method of claim 27, wherein the preliminary separation stage comprises a differential transportation designed to separate heavy, medium and light particles before introduction to the primary separation stage.

30. (New) The method of claim 23, further comprising transporting particles comprising heavy particles between the dropping, accumulating, and concentrating in the primary separation stage.

31. (New) The method of claim 23, wherein discharging comprises discharging heavy particles from an accumulation zone; and

the method further comprises collecting or feeding the discharged particles to a secondary separation stage.

32. (New) The method of claim 23, further comprising collecting or feeding particles from a discharge zone to a secondary separation stage.

33. (New) The method of claim 23, further comprising separating particles discharged from a discharge zone into a leading section, a central section, and a trailing section; and collecting or feeding the separated particles to a secondary separation stage.

34. (New) The method of claim 24, further comprising transporting particles comprising heavy particles between infeeding, stilling, and retaining in the secondary separation stage.

35. (New) A heavy particle separation apparatus, comprising a tiltable transverse belt, the tiltable transverse belt:
being configured to be moved in a direction transverse to the direction of movement of particulate material;
being concavely shaped in its central area; and
comprising a spiral formation having an effective pitch provided on the belt outer surface;
the spiral formation being configured to urge material upwardly along the belt,
a material feeder means disposed above the belt; and
a water spray system disposed above the belt.

36. (New) The apparatus of claim 35, further comprising a plurality of idler rollers adjustable in a vertical direction to provide a variable concave profile in the belt.

37. (New) The apparatus of claim 35, further comprising a classification system to provide the material feeder means with material smaller than about 2.5cm.

38. (New) The apparatus of claim 35, wherein the material feeder means comprises a feed conveyor belt, sloping chute, or feed conveyor belt and sloping chute so that it provides an even differential feed of material to the transversely operated transverse belt.

39. (New) The apparatus of claim 38, the material feeder means being provided above the transversely operated transverse belt and near one side thereof.

40. (New) The apparatus of claim 39, wherein the water spray system is provided above and near an opposite side of the transversely operated transverse belt with respect to the material feeder means.

41. (New) The apparatus of claim 35, in which the spiral formation is a rib or a groove having an effective pitch; the belt surface has an effective texture; or the spiral formation is a rib or a groove having an effective pitch and the belt surface has an effective texture.

42. (New) The apparatus of claim 35, wherein the rib or groove has a suitably varying pitch along its length.

43. (New) The apparatus of claim 35, wherein the rib or groove has a suitably varying height or depth, respectively, along its length.

44. (New) The apparatus of claim 35, further comprising:
a tailings trough at the lower end of the transversely operated transverse belt; and
a concentrate trough at the upper end of the transversely operated transverse belt.

45. (New) The apparatus of claim 44, wherein the concentrate trough leads to a secondary separation means comprising a sluice box to separate fine heavy material.

46. (New) The apparatus of claim 35, further comprising retaining or retention modules mounted on a conveyer means and being removable in continuous fashion for collection of heavy particles.

47. (New) A method of separating heavy particles, comprising using an apparatus of claim 13.